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ABSTRACT

In studies of classroom behavior modification, the experimenter or educator attempts to make valid judgments about desirable behavioral outcomes. Instruments of assessment to be used with behavior modification treatments must be sensitive to the behavioral goals of principals, teachers, and public school officials. Moreover the treatments used in behavior modification must incorporate teacher behavior. Specific criteria necessary for valid and reliable observing and recording techniques are also prerequisites to instrument development. The Durham Education Improvement Program has developed two instruments, Coping Analysis Schedule for Educational Settings (CASES) and Spaulding Teacher Activity Rating Schedule (STARS), to permit the study of the socialization process in ongoing school settings and treatment of behavior disorders by social agents. Two procedures requiring trained observers using technical aids (signal generators, and an event recorder with attached micro-switch keyboard) have been used; a third, employing wireless transmitting microphones in conjunction with the event recorder, is proposed. Short forms of CASES and STARS are appended along with recording sheets used to gather data in classrooms. Examples of criteria for rating observation techniques are included. (ES)

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Observational Methodology in the Experimental School Setting

Robert L. Spaulding[1]

In recent years a broad range of behavior modification techniques have been reported in the literature. Some of these focus on individual therapy in the psychologist's office or in the life situation of the individual patient. Other techniques have been developed to bring about change in groups of individuals in camp settings, hospitals, or schools.

Goldfried and Pomeranz (1968) have recently reviewed the problems of assessment relating to behavior modification techniques and have pointed out that the two general areas in which assessment is most inadequate is in deciding which specific behavior and which environment should become the target of treatment and secondarily what are the most appropriate and effective behavior modification techniques. The literature on behavior modification in the school settings, especially in ongoing public school settings, is very meager. Most researchers have been occupied with identifying relevant variables from the broad range of behavior observable in school settings and in the development of reliable and valid measures of relevant variables. It is only in the last year or two that the literature on classroom behavioral analysis has begun to reflect a concern with intervention techniques in relation to specific behavioral targets.

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The Significance of the Concurrent Environment

Classroom behavioral analysis has been slow to develop because of the complexity of the environment in which behavior change is observed and modified. Most classrooms are extremely complex social settings in which a number of social agents as well as a variety of objects serve to stimulate and reinforce all of the members of the group. In addition, the aversive and reinforcing consequences of behavior in the classroom setting are very complex both from the point of view of the natural environment and the contrived social environment of the school. In a recent book entitled The Technology of Teaching (1968), B. F. Skinner has made a very definitive analysis from the point of reinforcement theory and it is expected in subsequent years greater attention will be given to programs of behavior modification in complex classroom settings.

The Selection of Appropriate Behavior Modification Procedures

In studies of classroom behavior modification the experimenter or educator is perforce involved in attempting to make valid judgments about desirable behavioral outcomes. Behavioral goals in the public school setting are further constrained by policies set down by the school boards and public agencies charged with the responsibility of governing the schools. In addition, teachers and principals in each school give further definition to the behaviors desired and those behaviors which are to be systematically eliminated or fostered. Instruments of assessment to be used with behavior modification treatments in public school settings or experimental schools must be sensitive to the behavioral goals of the principals, teachers, and public school officials. The treatments used in behavior modification must also incorporate teacher behaviors which are reasonable to expect teachers to undertake and which they

can learn in a relatively short period of time. It is not practical to expect that teachers will be able to master reinforcement theory and make applications independently of specific treatment programs designed by specialists in clinical or educational psychology. Therefore, treatment programs must take into account the range of behaviors found normally in the repertoire of public school teachers and the likelihood that these can be systematically scheduled as well as the likelihood that specific new treatment behaviors can be introduced into the teacher's repertoire.

Assessment of behavior modification techniques in ongoing public school or experimental school settings generally boils down to the question of how this particular teacher can modify her behavior to provide a treatment which is appropriate for this particular child in this particular group of peers and the school environment in which the child has been placed. The degrees of freedom regarding treatment are constrained by the particular setting, including the characteristics of the teacher and those of the peers. In the experimental school, greater freedom exists as to making changes in the school environment but only relatively so.

Requirements of an Effective Assessment Methodology in the Experimental or Public School Setting

Valid and reliable observation and recording techniques to be used in ongoing public school experimental settings must be evaluated in terms of specific criteria such as the following:

1. Data collection procedures must take place in complex school or social settings during the process of transaction itself and in such a manner that the presence of observers or equipment does not continually stimulate the subjects under

observation. The first introduction of observers and equipment, of course, would bring about a disturbance but after a period of adjustment their presence must no longer bring about changes in the transactional setting under investigation.

2. In order to be valid in the educational sense the observational methodology used must produce data which reflects individual status as well as transactions on social variables relating to personality, socialization, academic achievement, and intellectual performance.

3. Methodology used must be highly reliable from the point of view of conventional tests of reliability of observation. For example, data should produce inter-observer agreements of .80 or higher on all variables, if possible. It is important in educational research and especially in behavior modification studies in school settings that the variables selected for assessment not be restricted only to those which yield high coefficients of reliability. Many of the most important goals of education involve personality and intellectual characteristics which are only indirectly measured, and research efforts should tolerate lower coefficients of reliability especially during investigations of current treatment practices and preliminary or pilot programs of intervention.

4. Data collection procedures in the ongoing school setting should also be relatively inexpensive so that the potential for expansion of the procedures into a large number of public school classrooms is very high. The expense of data collection is a function of the number of hours of actual observation and

recording but by far the most expensive process involves the transformation of data from the form in which it has been recorded in the classroom to coded form reflecting specific antecedent, intervening, and consequent variables. Not only is there the consideration of the amount of time spent in data collecting and processing, but also the level of training of technical personnel required during observation, processing, and analysis. Methodology which permits the use of specifically trained research technicians, assistant teachers, or even teacher aides or students in training can insure the wider use of the methodology in public schools generally.

5. Instrumentation developed for classroom behavior modification studies should be sophisticated enough to permit reliable measures of initial status, transitional status, or post-status along the following variables:

   a. Pupil personality, socialization, academic achievement and intellectual performance; and

   b. Teacher personality and intellectual characteristics as well as transactional variables relating to pupil socialization, acculturation, and intellectual development.

6. Observational technology should also permit continuous transactional data-gathering involving not only one teacher and one child, but several teachers interacting with several children in a variety of environmental settings. As technology improves, transactions involving two or three adults and four or five

children or more should become well within the technical ability of investigators in the experimental school setting.

In the future it would be valuable to develop techniques for recording transactions and individual behavior of two or three teachers transacting with 20 or 30 pupils in a variety of settings during a normal school day.

7. Classroom observational technology should also permit the development of norms so that comparisons might be made between the behavior of specific groups of children and their teachers and the characteristic behaviors of teachers and children in other schools in other parts of the country. This problem involves the identification of relevant variables in the environmental setting as well as those characterizing teacher and pupil behavior. It further requires the development of standardized settings in which instructional procedures and behavior modification techniques are practiced. It also involves the clarification of behavioral objectives both from the point of view of broad general educational objectives and the specific expectancies held by individual teachers, experimenters, and therapists.

Examples of Procedures and Techniques Developed in the Durham Education Improvement Program to Meet These Requirements

Because of the complexity of the transactional process in public education and the wide range of behavioral objectives, a large number of

instruments will need to be developed to cover the full range of variables involved. During the last decade the number of instruments developed has grown considerably and the better known of these have been collected and analyzed to some degree by Research for Better Schools (Mirrors for Behavior, 1968). In the Durham Education Improvement Program emphasis has been placed on socialization in early childhood education and the instruments developed for studies at this level have included two entitled A Coping Analysis Schedule for Educational Settings (CASES) and the Spaulding Teacher Activity Rating Schedule (STARS) which permit the study of the socialization process in ongoing school settings and the treatment of behavior disorders by adult social agents. Descriptions of these instruments and their use along with some sample studies are presented elsewhere (Spaulding, 1968).[1]

Methodology has been developed for the employment of CASES and STARS in behavior modification programs in the Durham Education Improvement Program. This methodology is relatively inexpensive and meets to some degree the requirements set forth in the preceding section. Among these procedures are the following, all of which require in situ observation by trained observers.

1. Using paper, pencil, clipboard, stop watch, and coded tally sheets the trained research technician or teacher aide samples or records continuously the observed behavior of a child, the teacher, or the

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[1] Short forms of both CASES and STARS are appended along with recording sheets used in gathering data in the classroom.

child and the teacher simultaneously. Samples are usually taken on a 5 to 10 second sampling schedule for minimum observation periods of 20 to 30 minutes or until the specific environmental setting has substantially changed. Using this technique the observer positions himself in a chair near the teacher where the faces of the children or the individual subject being observed can be easily seen. The observer follows a rhythm which involves observing the child, scoring, checking the sampling interval on a stop watch, observing the child, and scoring again. Coding is done on the spot whether the individual child is being observed, the teacher, or the two in transaction.

This particular procedure permits a wide range of data collecting activities in ongoing public school and experimental school settings and can be undertaken with very minimal disruption of ongoing classroom programs. Observers readily become ignored by the subjects under observation and the data are quickly transformed for subsequent analysis. For every hour of observation and recording, approximately one-half hour is required to transform the data for card punch procedures or for plotting on charts and graphs. The same individual who observes and records can prepare the necessary tables of data for card punching or chart production. Data can also be fed back to the

agents of treatment (teachers or experimenters) at the end of school classes on the same day. Studies using these procedures have demonstrated that undergraduates in psychology or education can be trained with sufficient reliability (.80 or better) in two to three weeks.

A variation of this technique involves the use of a signal generator to produce 5 or 10 second signals in the ear of the observer. This equipment permits the technician to dispense with the stop watch and maintain constant surveillance of subjects being observed.

2. An alternative procedure which has the advantage of increased reliability and the ability to record the behavior of a teacher and more than one child in transaction at the same time incorporates an electrically driven event recorder with a micro-switch keyboard attached (Figure 1). This assembly permits the observer to maintain a continuous record of ongoing behavior of an individual child, an individual teacher, or a teacher transacting with one or two or even three or four children at the same time. When a single teacher, a single child, or a teacher and a child, are being observed, a single technician can code continuously using CASES and STARS without removing her eyes from the subjects. The keyboard is memorized in the same manner that a person memorizes a typewriter keyboard. When a teacher is being observed transacting with one, two, three or four children it is possible to use two observers with each observer operating a different portion of the keyboard. When using the event recorder and micro-switch keyboard, the time sequence is maintained by the horizontal alignment of the pens and the movement of the paper through the

event recorder at a constant speed. The disadvantages of this arrangement are, primarily, the increased time it takes to render the data in coded form for subsequent analysis and also the increased restrictions placed upon the observer in terms of mobility within the classroom setting.

The event recorder is located on a portable table with wheels, and requires a source of electricity. If it is put in place before class convenes and remains in one place during the time the children and teachers are interacting, the equipment does not become a disturbing element, after an initial period of adjustment to its presence.

It takes about two hours of technicians' time to remove information from the event recorder papers and post them for subsequent data analysis for each hour of observation. When transactional data are gathered using two technicians, and the data reflect the behaviors of more than one child and the teacher, it takes about three hours of desk work for every hour of observation to transform the data to numerical form.

3. A third technique is under investigation in EIP in order to gather data in a large auditorium in which approximately 60 children are interacting in a variety of ways with four teachers and four teacher aides. This technique involves the use of a

wireless transmitting microphone held by the research technician who moves in proximity to the subject or subjects being observed, coding into the mike in whispers. The receiver is placed in another room where a technician sits at an event recorder and actuates the keyboard according to the numbers heard on the radio receiver. This technique permits the event recorder to be placed in one location and not have to be moved, and gives the technician complete flexibility in moving about the room or throughout the building as necessary. The disadvantages here are that two trained persons are required during the period of observation, and there is some possibility of disturbance to the subjects observed by the whispering of the observer. The advantages of the event recorder are, however, retained and with two transmitting microphones and two keyboard operators at the same event recorder keyboard with headsets, it is possible to take data on complex transactions between one or two teachers and one or two children in a highly mobile school setting. Time to transform data from the event recorder paper to charts or for subsequent data processing are similar in this case to the second procedure discussed above.

Reliabilities Obtained in Laboratory Studies

Examples of reliabilities obtained in studies using several of these alternatives are presented in the following table. These are samples from research undertaken over the past three years in the Durham Education Improvement Program.

Table 1

Examples of reliabilities obtained using the
Coping Analysis Schedule for Educational Settings (CASES)

Method of data collection	Observers E x J	E x K	J x K
1. Two observers using paper, pencil, clipboard, 10 second time samples, synchronized stopwatches, with 10 minutes of observation of same child.	.85 .82 .90 .87 .80 .75 .92 .92 .97	.78 .88 .87	.82 .82 .95
2. Two observers using two event recorders and observing the same child for 10 minutes.	.76 .75 .80 .86 .92		
3. Two observers, one using an event recorder and the other using paper, pencil, stopwatch and a 10 second sampling procedure for 10 minutes of observation of one child.	.92 .79		

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A Coping Analysis Schedule
for Educational Settings (CASES)*

(Brief Form for Quick Reference)**

1. Aggressive Behavior:

   Direct attack: grabbing, pushing, hitting, pulling, kicking, name-calling; destroying property: smashing, tearing, breaking.

2. Negative (Inappropriate) Attention-Getting Behavior:

   Annoying, bothering, whining, loud talking (unnecessarily), attention getting aversive noise-making, belittling, criticizing.

3. Manipulating, Controlling, and Directing Others:

   Manipulating, bossing, commanding, directing, enforcing rules, conniving, wheedling, controlling.

4. Resisting Authority:

   Resisting, delaying; passive aggressive behavior; pretending to conform, conforming to the letter but not the spirit; defensive checking.

5. Self-Directed Activity:

   Productive working; reading, writing, constructing with interest; self-directed dramatic play (with high involvement).

6. Paying Close Attention; Thinking, Pondering

   Listening attentively, watching carefully; concentrating on a story being told, a film being watched, a record played; thinking, pondering, reflecting.

7. Integrative Sharing and Helping:

   Contributing ideas, interests, materials, helping; responding by showing feelings (laughing, smiling, etc.) in audience situations; initiating conversation.

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8. Integrative Social Interaction:

Mutual give and take, cooperative behavior, integrative social behavior; studying or working together where participants are on a par.

9. Integrative Seeking and Receiving Support, Assistance and Information:

Bidding or asking teachers or significant peers for help, support, sympathy, affection, etc., being helped; receiving assistance.

10. Following directions passively and submissively:

Doing assigned work without enthusiasm or great interest; submitting to requests; answering directed questions; waiting for instructions as directed.

11. Observing Passively:

Visual wandering with short fixations; watching others work; checking on noises or movements; checking on activities of adults or peers.

12. Responding to Internal Stimuli:

Daydreaming; sleeping; rocking or fidgeting; (not in transaction with external stimuli).

13. Physical Withdrawal or Passive Avoidance:

Moving away; hiding: avoiding transactions by movement away or around; physical wandering avoiding involvement in activities.

Note: Categories 3, 5, 6, 7, 8, and 9 are further coded as a or b in structured settings to indicate appropriate or inappropriate timing or location of activity (based on the teacher's expectations for the setting). Example: 5a would be recorded when a child was painting during art period (when painting was one of the expected activities). Painting during "story time" or in an academic setting would normally be coded 5b. The code a represents behaving in a certain coping category at the "right" time and place; b represents behaving in a certain coping category at the "wrong" time or place. What is "right" or "wrong" is based on the values and goals of the teacher or authority responsible in a given situation.

A child might be sharing with another child in an integrative manner (7) some bit of information the teacher regarded as highly inappropriate. It would be coded as 7b since it was an integrative act of sharing occurring at the "wrong" time in the "wrong" place, from the point of view of the teacher.

The Spaulding Teacher Activity Rating Schedule (STARS)*

(Brief Form for Quick Reference)**

A. Molar Categories (Areas of educational concern):

Cognitive Transactions - Teacher-child transactions focusing on modification of thinking and conceptual structures.

Social Behavior Management - Teacher-child transactions focusing on modification of social transactions, impulse control, and classroom routine.

Motor Instruction - Teacher-child transactions focusing on modification of motor activities, including fine and gross motor control.

Conversing - Teacher-child transactions not focused on modification of child behavior. Coded as Talk (T) or Listening (L) depending on direction of transaction.

Non-Child - Teacher behaviors not child transactional. Coded as "A" (for teacher-other adult transactions) and "P" (for personal activities).

B. Modification Categories (Techniques of behavior modification):

\+ Approval - Teacher operants with generally reinforcing affect (affective loadings take priority over cognitive content)

\- Disapproval - Teacher operants with generally punishing affect (aversive loadings take priority over cognitive content)

S Structuring - Teacher operants setting or eliciting performance goals and action, or proscribing certain actions (without aversive affect)

R Restructuring - Teacher operants repeating or modifying structuring behaviors; when negative affect is present score as disapproval (-).

N Neutral - Teacher operants conveying information (but not setting or eliciting performance)

L Listening and observing - Teacher attending to child or group operants

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* © 1967, Robert L. Spaulding.

** Revised August 4, 1968.

C. Cognitive Structuring Categories (to be coded only during the Cognitive Transactions "S," "R," "N," and "L"):

D Data ↑ - task parameters given in concrete or raw datum form, with goal the derivation of concepts, generalizations, or a product in which understanding of a concept or generalization is implicit.

C Concept ↑ - task parameters given in terms of names of objects or concepts or verbal descriptions of concepts, with goal the derivation of generalizations or a product in which understanding of a generalization is implicit.

G Generalization ↓ - generalizations given in verbal form with task limited to the derivation of instances (at datum or concept level).

I Naming or labeling - raw data, concrete instances, or verbal descriptions of concepts or generalizations presented or confirmed with names attached. Task limited to the memorization of names and/or discrimination of the setting in which the name applies.

E Evaluating, commenting - evaluative or other comments on the cognitive content at hand or related content of any kind.

Note: Teacher-child transactions (or other teacher actions) are coded at three levels, in the following order:

A. At the molar level (Level A),
B. At the modification level (Level B) within the three molar categories, where behavior change is desired, and
C. At the cognitive structuring level (Level C) within the cognitive transactional molar category only.

School _____ Observer _____

Grade _____ Date _____

CASES - Data Sheet

Beginning Time _____ End Time _____

Setting (situation and activity) _____

Child or time interval	1	2	3	4	5	6	7	8	9	10	11	12	13	Comments
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STARS - Data Sheet

School _____ Grade _____ Observer _____ Date _____

Beginning Time _____ End Time _____

Setting (situation and activity) _____

	Cognitive Structuring						Social Behavior Management						Motor Structuring						Conversations		Non-Child	
Time	+	-	S	R	N	L	+	-	S	R	N	L	+	-	S	R	N	L	T	L	A	P
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Note: Cognitive Structuring categories (to be used in S, R, N, L columns):

D = Data G = Generalization E = Evaluating
C = Concept I = Naming